

and that *Magori* teaches a second transmitter receiver pair mounted so that the ultrasonic paths of both pairs are antiparallel as noted in Fig. 3 of *Magori*.

The applicant's independent claims 1, 8, and 13 recite, *inter alia*, anti-parallel paths. By definition, and as is known to one of ordinary skill in the art, anti-parallel does *not* mean not parallel. See, for example, Merriam-Webster's Collegiate Dictionary on-line where "anti-parallel" is defined as "parallel but oppositely directed or oriented".

In contrast to the applicant's claimed invention, *Magori* teaches two transistor receiver paths that are oblique. In fact, *Magori* teaches "a measuring arrangement which is formed by two ultrasound measuring paths intersecting in the flow axis of the measuring tube". See *Magori* at col. 2, lines 14-16 and Fig. 3. Compare, e.g., the applicant's independent claims, specification, and applicant's Fig. 2 (as well as 2A and 2B). *Magori*'s paths are neither parallel nor oppositely directed or oriented. One skilled in the art would recognize that *Magori*'s paths are inappropriate for tag. Moreover, in contrast to the applicant's claims 1 and 8, and in contrast to the primary reference *Sheen et al.*, *Magori* teaches a phase difference method (see for example, column 2, lines 7-8) as opposed to determination of a time interval representative of flow.

It is clear that either separately or combined, *Sheen et al.* and *Magori* fail to teach each and every element of the applicant's independent claims 1, 8 and 13. Accordingly, claims 1, 8 and 13, and the claims which depend from them namely claims 2-7, 9-12 and 14-15 respectively, are not obvious over the cited references and thus are in condition for allowance.

The Examiner also rejects claims 2, 5-6, 11 and 14 under 35 U.S.C. §103(a) as being unpatentable over *Sheen et al.* in view of *Magori* as applied to claims 1 and 8, and further in view of U.S. Pat. No. 4,528,857 to *Bruner*. The Examiner further rejects claims 7, 12 and 15

under 35 U.S.C. §103(a) as being unpatentable over *Sheen et al.* in view of *Magori* and *Bruner* as applied to claims 5, 8 and 13, and further in view of U.S. Pat. No. 5, 503,035 to *Itoh et al.*

As set forth above, claims 1 and 8 are not obvious over *Sheen et al.* in view of *Magori*, and thus dependent claims 2, 5-6, 11 and 14 are allowable for that reason. Also, claims 7, 12 and 15 depend from independent claims 1, 8 and 13 respectively, and thus are allowable for at least the reasons set forth above.

Additionally, the applicant's dependent claims include elements not disclosed in the cited references, for example, where the claimed transducers are attached to a conduit having a nominal diameter under about two inches as in claim 11. Even if the Examiner is correct that one of ordinary skill in the art would recognize the advantages of securing a flow-metering device to a small conduit, it is the applicant's claimed invention that provided the solution to the technical problems involved with securing a flow meter to small conduits using tag. See, for example, the applicant's specification at page 5, lines 9-28, where the previous difficulties and limitations involved with small conduits is discussed.

Moreover, *Sheen et al.* and *Bruner* teach away from one another, and neither separately nor combined teach all of the elements of the applicant's claimed invention. For example, *Bruner* teaches a "non-invasive" ultrasonic flowmeter. In contrast, *Sheen et al.* teaches "a test section 10 for insertion into the flow line", or at minimum, the necessity of an "acoustic decoupler" 12 between pipe sections, i.e. and invasive system. Also, *Bruner* teaches the use of phase modulation of the ultrasonic signals. In contrast, *Sheen et al.* teaches the use of cross-correlation of the noise signal. In short, *Sheen et al.* and *Bruner* are not properly combinable, and there is no teaching, incentive or motivation supporting their combination. In any event, they do not and would not combine to teach or suggest the applicant's claimed invention.

Moreover, the addition of *Itoh et al.* does not supply the teachings absent from the other cited references. In contrast to the applicant's claimed invention, *Itoh et al.* does not teach or suggest, *inter alia*, use of tag, use of two signal paths, nor use of anti-parallel paths. Also in contrast to the applicant's claimed invention, which supplies noise reduction and increased signal to noise ratio using antiparallel ultrasonic signal paths, *Itoh et al.* instead teaches the use of pipe structures with deep grooves in order to reduce the level of noise. See *Itoh et al.* col. 10, lines 15-23 and Figs. 20, 21A and 21B.

Accordingly, the applicant's claims 2, 5-6, 7, 11, 12, 14 and 15 are in condition for allowance.

#### CONCLUSION

Each of the Examiner's rejections has been addressed or traversed. Accordingly, it is respectfully submitted that claims 1-15 are in condition for allowance. Early and favorable action is respectfully requested.

If for any reason this Response is found to be incomplete, or if at any time it appears that a telephone conference with counsel would help advance prosecution, please telephone the undersigned or his associates, collect in Waltham, Massachusetts at (781) 890-5678.

Respectfully submitted,



\_\_\_\_\_  
Thomas E. Thompkins, Jr.  
Reg. No. 47,136

California 

# Merriam-Webster DICTIONARY

Merriam-Webster

[Atlas](#) [Reverse Dictionary](#) [Rhyming Dictionary](#)  
[Dictionary](#) [Thesaurus](#) [Unabridged Dictionary](#)

One entry found for **antiparallel**.

Main Entry: **an ti par al lel**

Pronunciation: "an-tye-pär-əl, "an-tye-, -ləl

Function: *adjective*

Date: circa 1660

: parallel but oppositely directed or oriented <*antiparallel* electron spins> <two *antiparallel* chains of nucleotides comprise DNA>



## Shopping



NEW! Encyclopaedia Britannica Almanac 2003

Price: USD \$10.95  
A complete almanac for today's world!



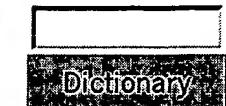
NEW! Britannica 2003 Ultimate Reference Suite DVD  
Price: USD \$69.95  
Only \$49.95 after mail-in rebate!

Get the **Top 10 Most Popular Sites for "antiparallel"**

For More Information on "antiparallel" go to [Britannica.com](#)

Find Photos, Magazines and Newspaper Articles about "antiparallel" at [eLibrary](#). Free registration required.

- **Search the Unabridged Dictionary on-line**  
and enjoy enhanced versions of Merriam-Webster's Collegiate® Dictionary and Thesaurus at Merriam-Webster Unabridged.
- **A new look (and sound!) for Merriam-Webster's Word of the Day**  
Along with a dynamic new easy-to-read format, our popular daily dose of word power now includes audio pronunciations. [Subscribe today!](#)
- **Listen to Word for the Wise radio programs**  
Listen to broadcasts or read transcripts of previous Word for the Wise programs on public radio.



Pronunciation Symbols		
\&\ as a and u in abut	\e\ as e in bet	\o\ as aw in law
\&\ as e in kitten	\E\ as ea in easy	\oi\ as oy in boy
\&r\ as ur/er in further	\g\ as g in go	\th\ as th in thin
\a\ as a in ash	\i\ as i in hit	\[th]\ as th in the
\A\ as a in ace	\I\ as i in ice	\u\ as oo in loot
\ä\ as ä in mäp	\J\ as j in job	\u\ as oo in foot
\au\ as ou in out	\[ng]\ as ng in sing	\y\ as y in yet
\ch\ as ch in chin	\O\ as o in g	\zh\ as si in vision

For more information see the [Guide To Pronunciation](#).



Merriam-Webster's  
Collegiate Dictionary  
& Thesaurus CD-ROM  
Price: USD \$21.20  
You save 15%!

[Home](#)

[Link to Us](#)

[Advertising Info](#)

[Company Info](#)

[Contact Us](#)

---

© 2003 by Merriam-Webster, Incorporated  
[Merriam-Webster Privacy Policy](#)

Visit Britannica Store